10 Collaboration and External Users of LM

All national weather services of COSMO are members of EUMETNET, the network of meteorological services within Europe. EUMETNET provides a framework to organize co-operative programmes between the members in the various fields of basic meteorological activities such as observing systems, data processing, basic forecasting products, research and development, and training (*www.eumetnet.eu.org*). COSMO's activities are embedded in this network and are especially related to EUMETNET programmes such as MAP-NWS (Mesoscale Alpine Programme - National Weather Services) and EUCOS (EUMETNET Composite Observing System).

Since the 1st of January 2000, EUMETNET provides a Coordinator for the SRNWP (Short Range Numerical Weather Prediction) Group. Representatives of the NWP branches of European National Meteorological Services meet in this group on a yearly basis to organize co-operative activities in development of numerical atmospheric models. The present SRNWP-coordinator is J. Quiby from MeteoSwiss. Within the SRNWP Group, Lead Centres have been selected for different topics. The Lead Centres have the responsibility to organize intercomparisons, workshops and to ensure the flow of information between participants. DWD has taken the role as the Lead Centre for Nonhydrostatic Modelling (responsible for this LC is Jürgen Steppeler from DWD) and UGM acts as Lead Centre for Short Range Ensemble Prediction Systems (responsible is Massimo Ferri from UGM). For more information on SRNWP and its Lead Centres see `http://srnwp.cscs.ch`.

All COSMO partners are also members of EWGLAM (European Working Group on Limited Area Modelling). This group meets once a year to exchange information on the current status and on recent developments in high-resolution numerical weather prediction.

Another type of collaboration with other European meteorological services is via COST, an intergovernmental framework for European *Co-operation in the field of Scientific and Technical Research*, allowing the co-ordination of nationally funded research on a European level (for more information about COST see *www.netmaniacs.com/cost*).

10.1 International Projects

This section lists the current participation of COSMO partners in international research projects which are related to LM. This list will be updated in the forthcoming issues.

- **SPP 1167** *Priority Program of the DFG: Quantitative Precipitation Forecast*
  Type: Funded by the german national science foundation *Deutsche Forschungsgemeinschaft* (DFG).
  Aim: Research of atmospheric processes and models to enhance the predictability of quantitative precipitation.
  DWD-contribution: *Central coordination for using DWD models (LM, NUmerical EXPerimentation System NUMEX) and data.*
  MeteoSwiss-contribution: *Improving short-term quantitative precipitation forecasts using radar rainfall assimilation with latent heat nudging.*
  Information: `http://www.meteo.uni-bonn.de/projekte/SPPMeteo`.

- **COST 722** *Short range forecasting methods of fog, visibility and low clouds.*
  Type: COST concerted research action
  MeteoSwiss contribution: *Coupling of the 1d COBEL model with the aLMo.*
  Information: `http://137.248.191.94/cost/`.

- **COST 731** *Propagation of Uncertainty in advanced meteo-hydrological Forecast Systems.*
  Type: COST concerted research action (will begin at the end of June)
  Aim: The Action will address the problem of forecasting (heavy) precipitation events and the corresponding hydrological processes in connection with the uncertainty inherent in this task. Building on experiences in COST 717 the established cross community communication between hydrologists, radar scientists and NWP modellers will be further strengthened.
  DLR contribution: *Application and further development of the regional ensemble system building on COSMO-LEPS, remote sensing observations (Satellite, Radar) and corresponding synthetic imagery and a pattern recognition algorithm.*
  Information: web-site not yet available

- **CLOUDNET** *Development of a European pilot network of stations for observing cloud profiles.*
  Type: EU funded project.
  Aim: Optimization of the use of existing data sets to develop and validate cloud remote sensing synergy algorithms; provision of data for the improvement of the representation of clouds in climate and weather forecast models.
  DWD contribution: *Provision of LM data for selected grid points for statistical and process-related verification.*
  Information: `http://www.met.rdg.ac.uk/radar/cloudnet`.

- **FUMAPEX** *Integrated Systems for Forecasting Urban Meteorology Air Pollution and Population Exposure* Type: EU funded project.
  DWD contribution: *Application of NWP for air-quality forecasting; improvement and urbanization of LM (at a very high resolution up to 1.1 km) and dispersion models; mesoscale model intercomparison.*
  ARPA-SIM contribution: *Preparing an urban air quality information system.*
  MeteoSwiss/EPF Lausanne-contribution: *Investigation of near-surface exchange processes, especially urban turbulence parameterization.*
  Information: `http://fumapex.dmi.dk`

Furthermore, a number of activities of COSMO members are related to the *Mesoscale Alpine Project* (MAP). For more information, see the MAP homepage at *www.map.ethz.ch.*

10.2 National Projects and Collaboration

This section lists LM-related projects and collaboration of COSMO members on a national level. At present, the list is by no means complete. Please inform the editors on such activities, especially those with national funding, in order to get a more complete list in the next COSMO newsletter.

- **DWD / Ruhr-Universität Bochum / Gesellschaft für wasserwirtschaftliche Planung und Systemforschung / Büro für angewandte Hydrologie (Berlin): Mulde-Projekt**
  Type: Funded by BMBF ("Verbundprojekt").
  Aim: Installation and pre-operation of an improved system for flood-warnings by a tighter coupling of the different components involved in flood forecasting.
  DWD-contribution: *Provide precipitation scenarios with probabilities for hydrological modelling derived from forecasts of LMK, COSMO-LEPS and SRNWP-PEPS. Of importance are mainly the quantifications of the uncertainties in the precipitation forecast and a consistent description of these by all scenarios.*

- **MeteoSwiss/NCCR Climate**
  National Centre of Competence in Research - Climate.
  Type: Nationally funded research project
  Information: `http://www.meteoswiss.ch/nccr`.

- **MeteoSwiss/University of Berne**
  Extraction of snow-cover, lake-temperature, NDVI, LAI, land surface temperature and albedo from NOAA satellites, primarily for the data assimilation suite.
  Type: bilateral project, partially funded by MeteoSwiss

- **MeteoSwiss/ETH Zürich**
  Extraction of snow-cover from Meteosat satellites, primarily for the data assimilation suite.
  Type: bilateral project, funded by EUMETSAT (Fellowship)

- **MeteoSwiss/EMPA**
  Determination of typical source regions of air pollutants for stations of the national air quality observing network.
  Type: BUWAL project with partial funding (EMPA only)
  Information: `http://www.empa.ch` > Organisation > Mobilität und Umwelt > Luftfremdstoffe / Umwelttechnik > Ausbreitungsmodellierung

- **MeteoSwiss/PMOD-WRC**
  Longwave radiation measurements compared to radiative transfer model and aLMo (terminated autumn 2004).
  Type: Swiss National Science Foundation Project "Greenhouse-effect in the Alps: by models and observations".
  Information: `http://www.pmodwrc.ch/pmod.php?topic=asrb`.
  Publication: Duerr, B., Philipona, R., Schubiger, F. and Ohmura, A. (2005): " Comparison of modeled and observed cloud-free longwave downward radiation over the Alps", to appear in Met. Z.

- **MeteoSwiss/PartnerRe**
  High-resolution re-analysis of extreme weather events. Computation with LM [at the Swiss Center for Scientific Computing (CSCS)] of winter storms (1957-2002) over

Europe based on initial and boundary fields from the ECMWF ERA-40 Project. Calculation of wind gusts with an alternative approach by Brasseur (2001) using the height of the balance between turbulent kinetic energy and the buoyancy force.

- **MeteoSwiss/HSK**
  Development of a new system for the security surveillance of atomic power plants in Switzerland, based on a high resolution implementation of the aLMo and new remote sensing capabilities.
  Type: Bilateral project.

- **CLM**
  In autumn 2001, the German community on regional climate modelling decided to use the Lokal-Modell as a basis for a new regional climate model. The first version of CLM (Climate Version of the LM) has been derived from the release 2.14 of LM. Meanwhile, CLM 3 (based on LM Version 3.1) is used. In 2004 a *Community Agreement* was signed by several partners on the use of CLM, which is supported by DWD. The major extensions to LM necessary for the climate version will be taken over to LM. You find information on this modelling group and the related model developments at the CLM web-site `http://w3.gkss.de/CLM/index.html`.

- **ICON**
  The Max Planck Institute for Meteorology in Hamburg (MPI) and DWD have started a joint research project to develop ICON (ICOsahedral Nonhydrostatic), a unified global model to be used both for climate studies and operational short range weather forecasting. The model will employ finite volume numerical techniques to discretize the fully compressible nonhydrostatic equations on a geodesic, icosahedral grid. More information is available at the ICON web site `http://icon.enes.org`.

- **AFO2000**
  The German Atmospheric Research Programme 2000-2006 (AFO200) is funded by the Federal Ministry for Education and Research. It aims to improve the understanding of the atmospheric system including earth-surface interactions, chemistry, dynamics, radiation and their interactions, multiphase processes, and atmosphere-system analysis. DWD contributes with LM-based studies in various subprojects. More information is available at the web site `http://www.afo-2000.de`.

10.3 External Users of LM

The source code of the LM-package is available free of charge for scientific and educational purposes to third parties outside COSMO. Such external users, however, must register and sign a special agreement with a COSMO meteorological service. For questions about the request and the agreement, please contact Dieter Frühwald (dieter.fruehwald@dwd.de) from the COSMO Steering Committee.

Meanwhile, a number of universities and research institutes have received the model software. Once a year, there is a *User Workshop on Scientific Applications of the LM* organized by Jürgen Steppeler at DWD (contact: juergen.steppeler@dwd.de, see also Section 7.4). There is, however, not always a feedback on the activities or on results and problems. The following table lists the current registered users of the LM (outside the COSMO group).

Institution	Country	Research Activities
Academy of Science, Hydrometeorological Institute	Bulgaria	unknown
Academy of Science, Institute for Physics of the Atmosphere, Prague	Czech Republic	Clouds and precipitation at high resolution
Alfred Wegener Institut, Bremerhaven	Germany	Cloud physics
Center for Marine Research Rudjer Boskovic Institute	Croatia	Ocean model simulations
Frontier Research, Institute for Global Change Research	Japan	Tests on time-splitting methods
German Aerospace Centre, Institute of Atmospheric Physics, Oberpfaffenhofen	Germany	Turbulence studies, model intercomparison
GKSS Research Centre Geesthacht	Germany	Regional climate simulations,
Institute for Tropospheric Research (IFT), Leipzig	Germany	Z-coordinate model version, turbulence studies
Konrad-Zuse Institut, Berlin	Germany	Scientific visualization
Massachusetts Institute of Technology, Cambridge MA	USA	unknown
Meteorological Research Institute	Japan	Model intercomparison
Meteorological Research Institute	Korea	unknown
National Center for Atmospheric Research, Boulder CO	USA	unknown
Norwegian Meteorological Institute (DNMI), Oslo	Norway	Model intercomparison
Potsdam Institute for Climate Impact Research (PIK), Potsdam	Germany	Regional climate studies, low Mach-number dynamics
Swiss Institute of Technology (ETH), Zürich	Switzerland	Regional climate studies High resolution experiments
Swiss Institute of Technology (EPF), Lausanne	Switzerland	Urban turbulence
Turkish State Meteorological Service	Turkey	Coastal wind simulations
University of Berlin	Germany	unknown
University of Bern	Switzerland	Land use and regional climate
University of Bonn	Germany	Physical initialization, statistical postprocessing, regional evaporation and water resource management
University of Bremen	Germany	Influence of water vapor in the upper troposphere on the climate

Institution	Country	Research Activities
University of Cologne	Germany	unknown
University of Dresden	Germany	Case studies
University of Frankfurt	Germany	Numerics and cloud physics
University of Genua	Italy	Dynamics of convective cells
University of Göttingen	Germany	Regional climate studies
University of Hamburg	Germany	unknown
University of Hannover	Germany	Aircraft icing
University of Hohenheim	Germany	Assimilation of LIDAR data
University of Karlsruhe	Germany	Soil modelling, case studies climate modelling, chemistry
University of Kiel	Germany	3D cloud models, radiation transport
University of Leipzig	Germany	Cloud physics, hydrology
University of Ljubljana	Slovenia	Latent heat nudging
University of Munich	Germany	Model comparison, case studies
University of Milano	Italy	Numerics, shaved elements